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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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09/370,135 08/09/99 SIVAVEC

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GENERAL ELECTRIC COMPANY  
CRD PATENT DOCKET RM 4A59  
BLDG K 1 SALAMONE  
PO BOX 8  
SCHENECTADY NY 12301

EXAMINER

ZIMMER, M

ART UNIT

PAPER NUMBER

1712

DATE MAILED:

04/24/01

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 09/370,135             | SIVAVEC ET AL.      |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Marc S. Zimmer         | 1712                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 August 1999.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 33-49 is/are pending in the application.
- 4a) Of the above claim(s) 18-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-17 and 33-49 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

#### Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-17 and 33-49, drawn to a product and a method of use, classified in class 422, subclass 88.
- II. Claims 18-32, drawn to a composition, classified in class 428, subclass 482.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as mutually exclusive species in an intermediate-final product relationship. Distinctness is proven for claims in this relationship if the intermediate product is useful to make other than the final product (MPEP § 806.04(b), 3rd paragraph), and the species are patentably distinct (MPEP § 806.04(h)). In the instant case, the intermediate product is deemed to be useful as a water repellant for textiles and the inventions are deemed patentably distinct since there is nothing on this record to show them to be obvious variants. Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions anticipated by the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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During a telephone conversation with Toan Vo on April 16, 2001 a provisional election was made with traverse to prosecute the invention of group I, claims 1-17 and 33-49. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-32 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Specification***

The disclosure is objected to because of the following: Applicants use the subscripts m, n, x, and y to denote the number of repeat units of each monomeric unit from which the copolymer is assembled. However, these variables are not defined anywhere in the specification.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 5 and 37 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The word "partition" as used herein is ambiguous as to its intended meaning. Clarification is required.

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Claims 14-17 and 46-49 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. As iterated above, the quantities of the monomeric subunits from which the copolymers are derived, represented by m, n, x, and y, is not addressed.

Claims 33-49 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The meaning of "operational sensitivity" is not clear and the phrase receives no support from the specification. It is believed that Applicants had, perhaps, intended to recite changes in operational *frequency* with respect to the change in oscillation frequency observed as the polymer film uptakes VOC vapors. In any case, clarification is required.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim, as written, is not in full agreement with the comparable description provided on page, lines 12-19 of the specification. For instance, whereas it is clear that the sensor substrate is an AT-cut quartz crystal according to

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page 8, line 14, the description of said substrate in claim 12 is considerably more convoluted.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

In claims 1-2, and 7-11, and 13-17, Applicant discloses a “sensor” that is essentially a polymer-coated substrate insofar as there is no provision for a signaling/wave producing- or detection means. As such, several of these claims are treated herein as merely reciting a polymer film of the designated structure on a substrate for which no limitations have been offered.

Claims 1, 2, and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyoshi et al., JP 08-311233, Ozawa, U.S. Patent # 5,738,158, and Steenblock et al., U.S. Patent # 5,703,161. These references disclose several of the polymer materials contemplated by the instant invention and their application as films to various substrates. The characterization of these polymers as containing hard and soft segments is mentioned explicitly. (The Ozawa reference is silent as to the morphological characteristics of the film disclosed therein however Applicant has admitted that copolymers of polybutylene terephthalate and polyoxyalkylene diimide diacid contain the required hard and soft segments.)

Claim 7 is rejected under 35 U.S.C. 102(b) as being anticipated by Miyoshi et al., JP 08-311233. Miyoshi discloses the preparation of a polyester elastomer having hard and soft segments that is employed as a coating material for textiles.

Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Ozawa et al., U.S. Patent # 5,738,158. Ozawa discloses the utilization of a copolymer having identical chemical constitution as a film for pneumatic tires.

Claims 9 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Glans, U.S. Patent # 5,900,471. Glans describes the utilization of a copolyetheramide having hard and soft domains as a film for laminating fabric. The copolymer is comprised predominantly of, for example, polyethylene/polypropylene oxide which make up the soft fragment whereas the hard fragments are derived from an aliphatic- or aromatic polyamide.

Claim 14 is rejected under 35 U.S.C. 102(b) as being anticipated by Hawkins, U.S. Patent # 4,994,532. Hawkins discloses the preparation of polysiloxanecarbonates in which the polycarbonate portion includes those prepared from bisphenol-A (column 3, line 33) and either phosgene or a dialkyl/aryl carbonate. The polycarbonate may be reacted with a carboxylic acid-functionalized silicone (column 6, lines 15-28) such as polydimethylsiloxane in the melt. Their use as coatings is disclosed in column 1, lines 13-16.

Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Steenblock et al., U.S. Patent # 5,703,161. The focus of the Steenblock reference is the employment of a polyether/polyamide copolymer as water-repelling film. The

performance of this film is compared with other similarly behaving "well known" films such as the polybutylene terephthalate/polyethylene glycol coating material (column 5, lines 10-16) disclosed in claim 15.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rojstaczar, U.S. Patent # 5,209,981. Rojstaczar describes a method of synthesizing polyimidesiloxane block copolymers and their exploitation as coating materials. Although the structural aspects of the polymers taught herein are not disclosed in terms of hard and soft blocks, the anhydrides and diamines from which the polyimide unit are preferably those featuring aromatic rings (column 1, lines 55-68 and column 2, lines 10-58) which are commonly known to impart rigidity (hardness) to a polymeric compound. Likewise, one skilled in the art would recognize that the polysiloxanes that comprise the other block have extremely low barriers to rotation and, thus, are amorphous and soft.

Claims 1-3, 5-6, 13, 33-35, 37-38 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGill et al., U.S. Patent # 5,880,552 in view of Litwin, U.S. Patent # 6,056,805 and Grate et al. in Sensors and Actuators B (1991), 85-111.



Concerning claims 1-3, 6, 33-35 and 38, McGill discloses an improvement to a SAW chemical sensor that entails the coating the quartz substrate with a diamond-like carbon prior to applying the sorbent. This is done to alleviate problems associated with the accumulation of moisture at the interface between the quartz substrate and sorbent coating as the adsorption of water vapor presents difficulties in attempting to quantify the response from a SAW sensor device. Among the chemoselective coatings contemplated by McGill are polysiloxanes, polyimides, polyanilines, and, most relevant to the current discussion, polyalkylenes (column 6, lines 64-67 through column 7, lines 1-13). McGill does not disclose the utilization of a film having simultaneously hard- and soft domains.

Litwin et al. teach a method of absorbing non-polar organic compounds employing a device that features a hydrocarbon block copolymer as the sorbent. They state that only hydrocarbon copolymers having a specified percentage of soft alkylene- or polydiene segments and hard polystyrene segments could be successfully employed in the practice of their invention (column 4, lines 41-48). They further iterate that copolymers having a higher content of the polystyrene block failed to perform adequately (column 4, lines 50-53) which is consistent with Grate's contention that crystalline polymers are inferior as sorbents because the vapor cannot readily penetrate the non-porous framework (page 96, column 2). Nonetheless, Litwin asserts that the hard polystyrene portion is necessary to maintain the rigidity i.e. structural integrity of the sorbent material. (Loss of structural integrity was deemed a significant problem in the soft homopolymer materials of the prior art- see column 2, lines 1-8). The copolymer can be used in a multitude of configurations ranging from a pellet or cylinder

to a coating on a fiberglass surface (column 4, lines 65-67 through column 5, lines 1-23). The overall advantages of employing the copolymers taught by Litwin as sorbents are presented in column 6, lines 29-37. Said advantages include their ability to retain shape/structural integrity even at high vapor loadings and their potential for reuse. Given these benefits, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the hydrocarbon copolymer for the alkylene polymer in the SAW device disclosed by McGill.

As for claims 5 and 37, these claims are interpreted as stating that an equilibrium is established between the polymer sorbent and the gaseous environment with respect to the amount of a particular substance that is present in each "phase" in view of the discussion on page 9 of the specification. This presumably would hold true for any sorbent/gas system hence the claim is rejected by the prior art.

As for claims 13 and 45, following the "like dissolves like" principal, the hydrocarbon copolymers disclosed by Litwin are selective towards the absorption of aromatics, halogenated hydrocarbons and other non-polar materials (column 2, lines 50-60).

***Allowable Subject Matter***


Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc S. Zimmer whose telephone number is 703-605-1176. The examiner can normally be reached on Monday-Friday 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Dawson can be reached on 703-308-2340. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Marc S. Zimmer  
(703) 605-1176  
April 19, 2001

  
Robert Dawson  
Supervisory Patent Examiner  
Technology Center 1700